just a bit to tell you how extensively this nuclear technique is used in scientific crime investigation.

Recent court decisions concerned with violations of individual rights have placed a new importance on the role of physical evidence in criminal investigations and prosecution. This emphasis has challenged the forensic scientist to obtain more information from the evidence submitted for analysis. Neutron activation analysis is now being used extensively to support evidence obtained by other means and in some cases to provide information not obtainable elsewhere. The AEC's Division of Isotopes Development works with law enforcement agencies in the Justice, Post Office, and Treasury Departments in developing evidence in criminal cases using this technique.

Physical evidence supplied by neutron activation analysis was first used in a court case by the Internal Revenue Service in 1964. Since then the IRS has employed this method in some 1500 criminal cases. The technique is being used to examine a large variety of substances including paint, soil, bullets, metal, putty, adhesive tape, paper, grease, hair, wire, and gunshot residue. Irradiation of samples is done in much the same way as if they were from art objects or pottery fragments, with the primary objective of determining elemental composition.

One great advantage of this method is the fact that samples too small to be examined by other methods can be effectively examined by neutron activation analysis. Often paint or metal samples barely visible to the naked eye can be analyzed and compared with the appropriate control sample. Another advantage is that in most cases the analysis can be carried out nondestructively, and the sample can be retained for court evidence or for examination by other techniques. The primary drawback is the need for a high-flux reactor and rather sophisiticated counting equipment.

The supersensitivity of activation analysis for measuring submicrogram quantities of barium and antimony has provided the basis for detecting gunshot residue deposited on the hand of an individual who has fired a revolver (Figure 4). This procedure is now replacing the nonspecific dermal nitrate or paraffin test, which has only limited acceptance in the courts. Activation analysis of gunshot residue also will indicate whether a hole in some material is a bullet hole and whether the hole was made from a gun fired at close or distant range. Considerable research has gone into neutron activation analysis as it applies to gun crimes, and the IRS has come up with a special field kit to be used by investigators at